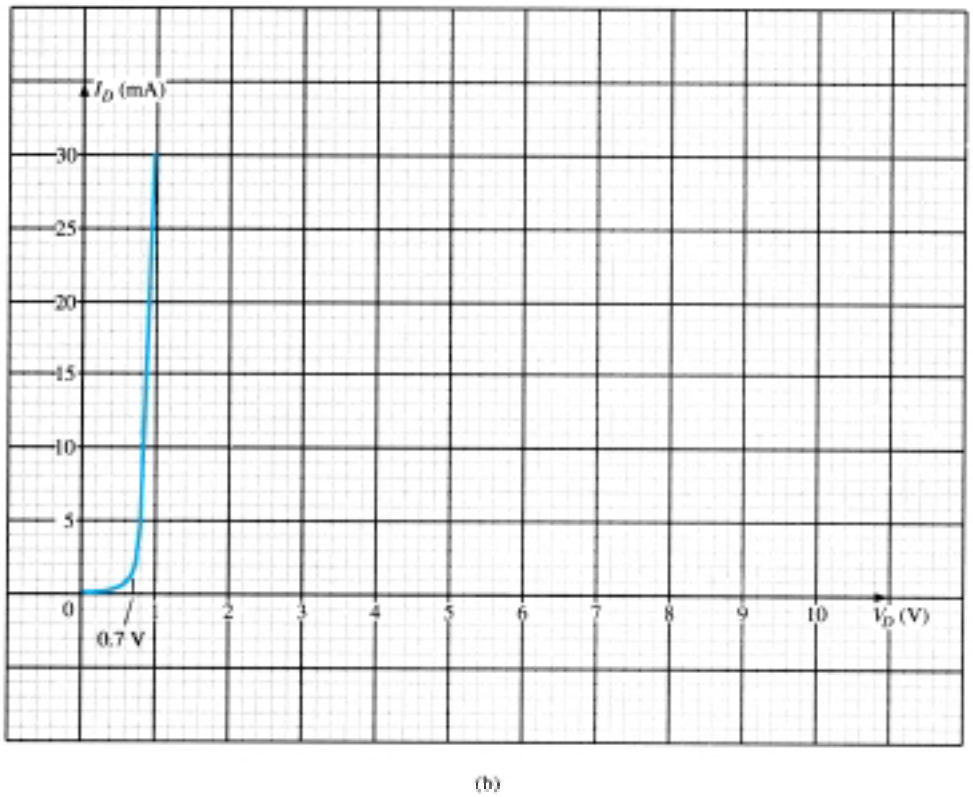
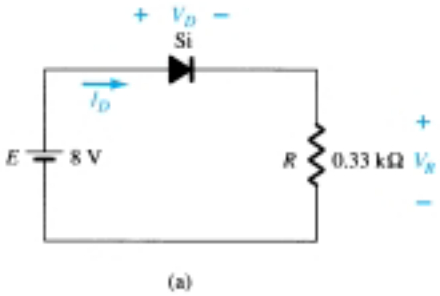
1. (a) Using the characteristics of Fig. 2.131b, determine I_D, V_D, and V_R for the circuit of Fig. 2.131a.
(b) Repeat part (a) using the approximate model for the diode and compare results.
(c) Repeat part (a) using the ideal model for the diode and compare results.



(b)



(a)

Figure 2.131 Problems 1, 2

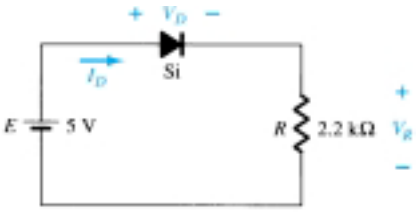


Figure 2.132 Problems 2, 3

2. (a) Using the characteristics of Fig. 2.131b, determine I_D and V_D for the circuit of Fig. 2.132.
(b) Repeat part (a) with $R = 0.47\ \text{k}\Omega$.
(c) Repeat part (a) with $R = 0.18\ \text{k}\Omega$.
(d) Is the level of V_D relatively close to 0.7 V in each case?

How do the resulting levels of I_D compare? Comment accordingly.

3. Determine the value of R for the circuit of Fig. 2.132 that will result in a diode current of 10 mA if $E = 7$ V. Use the characteristics of Fig. 2.131b for the diode.

4. (a) Using the approximate characteristics for the Si diode, determine the level of V_D, I_D, and V_R for the circuit of Fig. 2.133.
(b) Perform the same analysis as part (a) using the ideal model for the diode.
(c) Do the results obtained in parts (a) and (b) suggest that the ideal model can provide a good approximation for the actual response under some conditions?

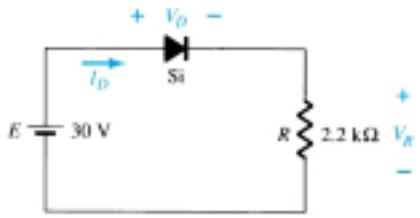


Figure 2.133 Problem 4

5. Determine the current I for each of the configurations of Fig. 2.134 using the approximate equivalent model for the diode.

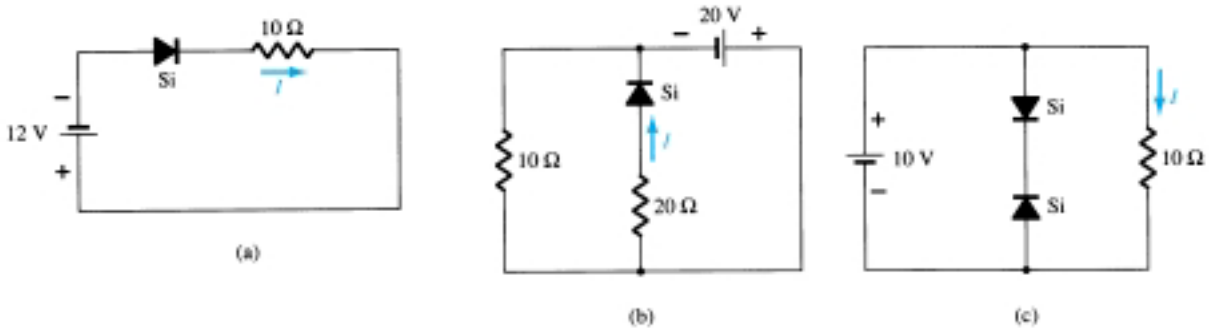


Figure 2.134 Problem 5

6. Determine V_o and I_D for the networks of Fig. 2.135.

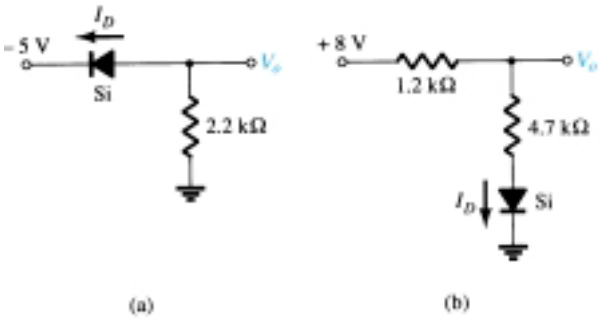


Figure 2.135 Problems 6, 49

* **7.** Determine the level of V_o for each network of Fig. 2.136.

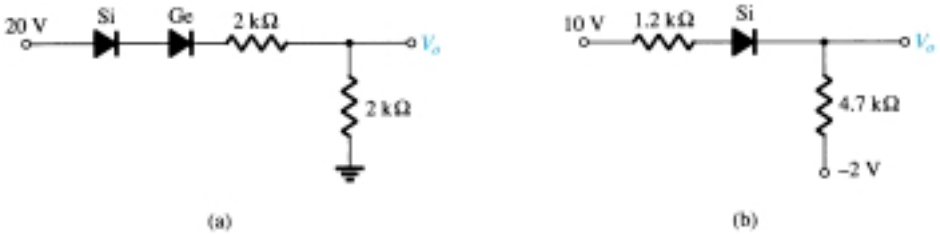


Figure 2.136 Problem 7

* **8.** Determine V_o and I_D for the networks of Fig. 2.137.

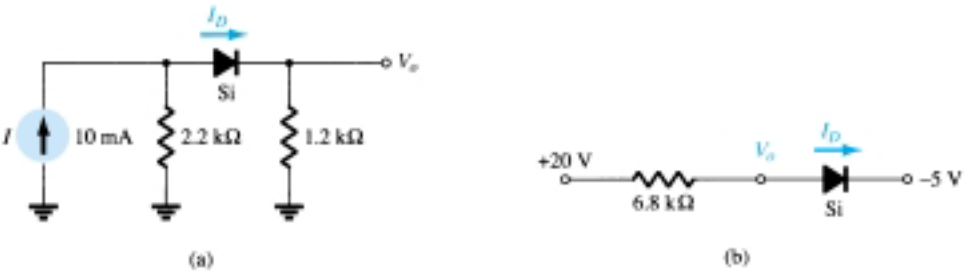


Figure 2.137 Problem 8

* **9.** Determine V_{o_1} and V_{o_2} for the networks of Fig. 2.138.

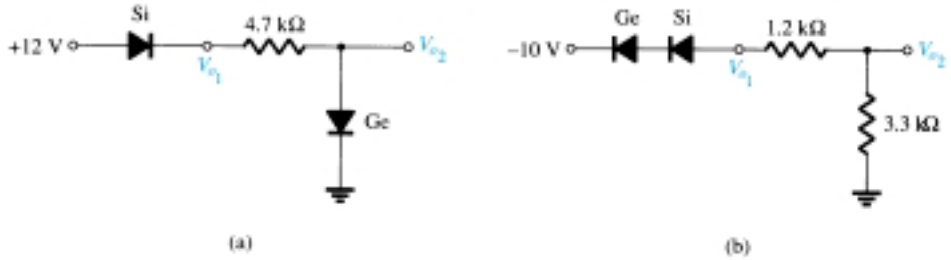


Figure 2.138 Problem 9

§ 2.5 Parallel and Series–Parallel Configurations

10. Determine V_o and I_D for the networks of Fig. 2.139.

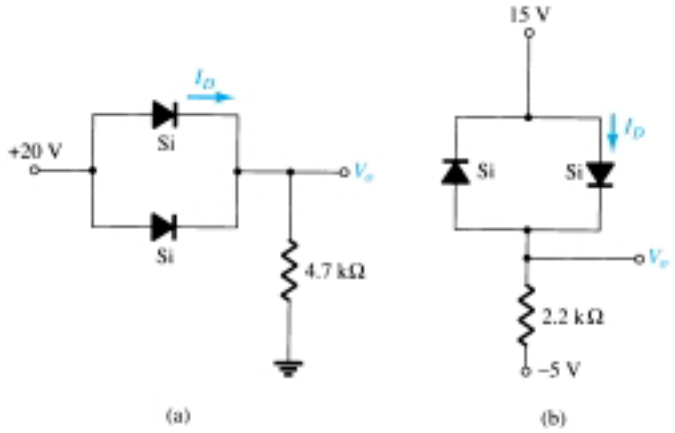


Figure 2.139 Problems 10, 50

* **11.** Determine V_o and I for the networks of Fig. 2.140.

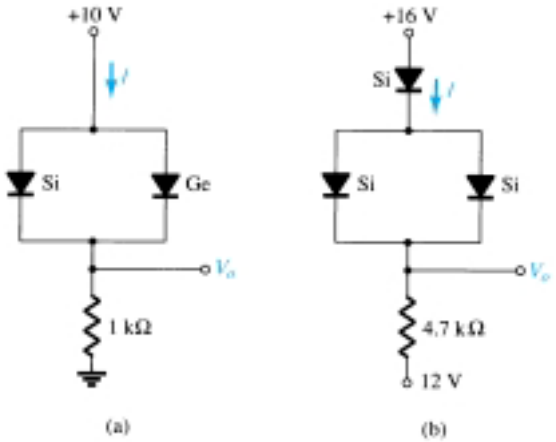


Figure 2.140 Problem 11

12. Determine V_{o_1}, V_{o_2}, and I for the network of Fig. 2.141.

* **13.** Determine V_o and I_D for the network of Fig. 2.142.

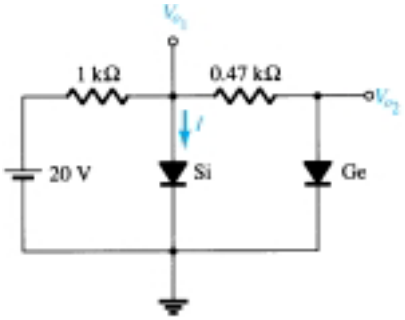


Figure 2.141 Problem 12

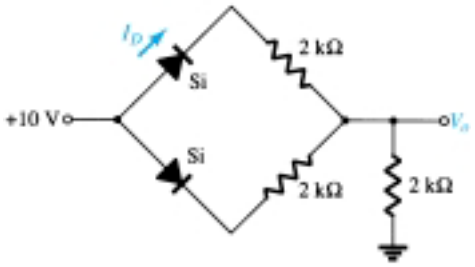


Figure 2.142 Problems 13, 51

§ 2.6 AND/OR Gates

14. Determine V_o for the network of Fig. 2.38 with 0 V on both inputs.

15. Determine V_o for the network of Fig. 2.38 with 10 V on both inputs.

16. Determine V_o for the network of Fig. 2.41 with 0 V on both inputs.

17. Determine V_o for the network of Fig. 2.41 with 10 V on both inputs.

18. Determine V_o for the negative logic OR gate of Fig. 2.143.

19. Determine V_o for the negative logic AND gate of Fig. 2.144.

20. Determine the level of V_o for the gate of Fig. 2.145.

21. Determine V_o for the configuration of Fig. 2.146.

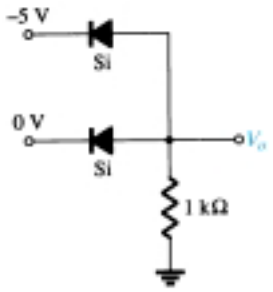


Figure 2.143 Problem 18

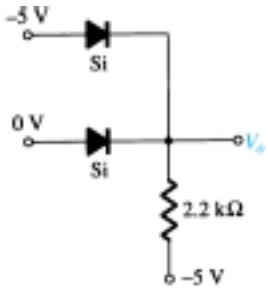


Figure 2.144 Problem 19

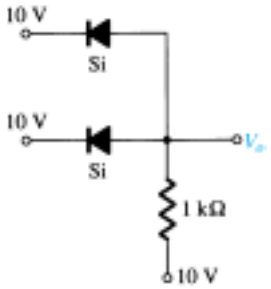


Figure 2.145 Problem 20

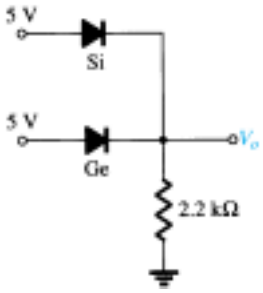


Figure 2.146 Problem 21

§ 2.7 Sinusoidal Inputs; Half-Wave Rectification

22. Assuming an ideal diode, sketch v_i, v_d, and i_d for the half-wave rectifier of Fig. 2.147. The input is a sinusoidal waveform with a frequency of 60 Hz

* **23.** Repeat Problem 22 with a silicon diode ($V_T = 0.7$ V).

* **24.** Repeat Problem 22 with a 6.8-kΩ load applied as shown in Fig. 2.148. Sketch v_L and i_L.

25. For the network of Fig. 2.149, sketch v_o and determine V_{dc}.

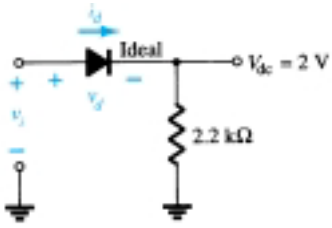


Figure 2.147 Problems 22, 23, 24

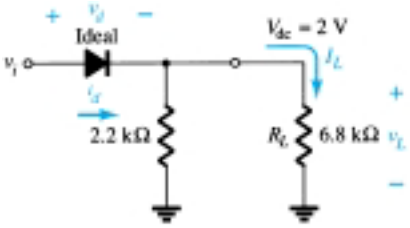


Figure 2.148 Problem 24

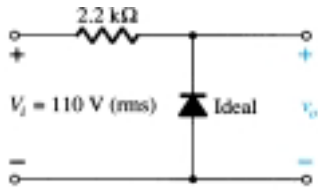


Figure 2.149 Problem 25